

CLAIMS

What is claimed is:

- 1) A non-transgenic domesticated *L. esculentum* plant having a flavonol content in the flesh of the fruit of said plant that is greater than 0.5 µg/mgdwt.
- 5 2) The non-transgenic domesticated *L. esculentum* plant according to claim 1, wherein said flavonol content is greater than 1.0 µg/mgdwt.
- 3) The non-transgenic domesticated *L. esculentum* plant according to claim 1, wherein said flavonol content is greater than 1.5 µg/mgdwt.
- 4) The *L. esculentum* plant according to claim 1, wherein said flavonol content is greater-
10 than approximately 2 µg/mgdwt.
- 5) The *L. esculentum* plant according to claims 1, 2, 3, and 4 wherein said flavonol content in said peel of said fruit is at least approximately 5 µg/mgdwt.
- 6) The *L. esculentum* plant according to claims 1, 2, 3, and 4 wherein said flavonol content in said peel of said fruit is at least approximately 10 µg/mgdwt.
- 15 7) The *L. esculentum* plant according to claims 1, 2, 3, and 4 wherein said flavonol content in said peel of said fruit is at least approximately 17 µg/mgdwt.
- 8) Seed of said *L. esculentum* plant of claim 1.
- 9) Fruit of said *L. esculentum* plant of claim 1.
- 10) A *L. esculentum* plant, or parts thereof, produced by growing the seed of claim 8.
- 20 11) A method of making a non-transgenic *L. esculentum* plant expressing flavonol in the peel and flesh of the fruit of said plant comprising the steps of:
 - a) crossing wild *Lycopersicon* species that express *CHI* in the peel and that express the genes of the flavonol biosynthetic pathway in the flesh with a *L. esculentum* plant to produce a hybrid plant;
 - 25 b) harvesting fruit from said hybrid plant; and
 - c) collecting seed from said fruit harvested in step b).
- 12) The method of making a non-transgenic *L. esculentum* plant according to claim 11 further comprising the step of screening *Lycopersicon* accessions for expression of *CHI* in the peel and/or for expression of one or more of the genes of the flavonol biosynthetic pathway in the flesh.
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- 13) The method of making a non-transgenic *L. esculentum* plant according to claim 12 and, wherein said *Lycopersicon* species selected for crossing with a *L. esculentum* plant are *L. chilense* or *L. pennellii*, or any other wild tomato species that express the genes of the flavonol biosynthetic pathway in the flesh and *CHI* in the peel of said fruit.
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- 14) The method of making a non-transgenic *L. esculentum* plant according to claim 13, wherein the accessions selected for crossing are LA1963, LA2884, and LA1926.
- 15) A non-transgenic domesticated *L. esculentum* plant comprising a genetic factor that up-regulates the flavonol biosynthesis pathway in the fruit flesh of said plant.
- 10 16) The non-transgenic domesticated *L. esculentum* plant according to claim 15, wherein the flavonol content in said fruit flesh is greater than 0.5 µg/mgdwt.
- 17) The non-transgenic domesticated *L. esculentum* plant according to claim 15, wherein the flavonol content in said fruit flesh is greater than 1.0 µg/mgdwt.
- 18) The non-transgenic domesticated *L. esculentum* plant according to claim 15, wherein the flavonol content in said fruit flesh is greater than 1.5 µg/mgdwt.
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- 19) The non-transgenic domesticated *L. esculentum* plant according to claim 15, wherein the flavonol content in said fruit flesh is greater than approximately 2 µg/mgdwt.
- 20) The *L. esculentum* plant according to claim 15 wherein the flavonol content in the peel of the fruit is at least approximately 5 µg/mgdwt.
- 20 21) The *L. esculentum* plant according to claim 15 wherein said flavonol content in the peel of the fruit is at least approximately 10 µg/mgdwt.
- 22) The *L. esculentum* plant according to claim 15 wherein said flavonol content in the peel of the fruit is at least approximately 17 µg/mgdwt.
- 23) Seed of said *L. esculentum* plant of claim 15
- 25 24) Fruit of said *L. esculentum* plant of claim 15.
- 25) A *L. esculentum* plant, or parts thereof, produced by growing the seed of claim 23.
- 26) A non-transgenic domesticated *L. esculentum* plant comprising a genetic factor that restores *CHI* expression in the fruit peel of said plant.
- 27) The *L. esculentum* plant according to claim 26 wherein the flavonol content in said fruit peel is at least approximately 5 µg/mgdwt.
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- 28) The *L. esculentum* plant according to claim 26 wherein flavonol content in said fruit peel is at least approximately 10 µg/mgdwt.
- 29) The *L. esculentum* plant according to claim 26 wherein the flavonol content in said fruit peel is at least approximately 17 µg/mgdwt.
- 5 30) The non-transgenic domesticated *L. esculentum* plant according to claim 26, wherein the flavonol content in the fruit flesh of said plant is greater than 0.5 µg/mgdwt.
- 31) The non-transgenic domesticated *L. esculentum* plant according to claim 26, wherein the flavonol content in the fruit flesh of said plant is greater than 1.0 µg/mgdwt.
- 10 32) The non-transgenic domesticated *L. esculentum* plant according to claim 26, wherein the flavonol content in the fruit flesh of said plant is greater than 1.5 µg/mgdwt.
- 33) The non-transgenic domesticated *L. esculentum* plant according to claim 26, wherein the flavonol content in the fruit flesh of said plant is greater than approximately 2.0 µg/mgdwt.
- 34) Seed of said *L. esculentum* plant of claim 26.
- 15 35) Fruit of said *L. esculentum* plant of claim 26.
- 36) A *L. esculentum* plant, or parts thereof, produced by growing the seed of claim 34.